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1. See Opposite.

2. Jones, D. E. ... Plan for ventilating, cooling and heating the Capitol, etc. Wash 1867.

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MR. SOMES'S INVENTIONS

FOR

THE PRESERVATION OF FOOD,

ANIMAL OR VEGETABLE,

FOR THE

COOLING OF HOTELS, THEATRES, HALLS, CHURCHES,

AND ALL OTHER BUILDINGS,

VENTILATION, &c., &c.

NEW YORK:
PRESS OF E. S. DODGE & CO., PRINTERS AND STATIONERS, 84 JOHN STREET.
1865.

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THE PRESERVATION OF FOOD.

An intelligent examination of history will demonstrate the correctness of the proposition that "demand is a sure prophecy of supply." Indeed, so bounteous is nature, and so vast are her resources, that it may well be doubted whether the human mind is capable of conceiving a well-defined desire which may not be gratified.

When man became aware of nakedness and hunger, the earth munificently yielded up her wealth of clothing and of food. When, by the exigencies of climate, man felt the want of artificial heat, nature responded with boundless forests; some standing erect in vigorous life, and others long ago stored up in coal-beds. If means of transportation across rivers, lakes and seas are desired, nature points to the fact that a hollow log will swim, and by that means the prayer of the petitioner is granted. And when man realized a want of the labor of animals, she taught him how to tame and use them for his purposes.

No reflecting mind can fail to notice also how opportunely all great discoveries have been given to our species. The Reaper and Mower would have been of no value when man was passing through an era designed to toughen his muscles and harden his constitution by physical labor, but were above all price when every strong arm was about to be required in the battle-field. The Sewing-Machine would have been an absolute injury in an age when human fingers needed education in nimbleness and skill. But now, when every gentle hand is required to soothe the sufferings of wounded men,

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and to minister to the little ones whom war has severed from their fathers, the Sewing-Machine becomes a blessing of incalculable worth.

Doubtless, it is in accordance with the designs of Providence that the present age tends to intellectual rather than to physical development—to machinery in place of toil—to ideas instead of action—to the substitution of natural forces, water, steam, air, electricity, and gravitation, for animal strength—to comfort and ease instead of labor and exposure. If evidence of this fact were wanting, we might with safety hazard the assertion that man has fully doubled his intellectual property within the last forty years, while his muscular system has become absolutely less powerful.

THE GREAT WANT OF THIS AGE,

that which more than all things else has demanded the attention of scientific men, has been the discovery of some means for *preserving* what the earth yields for human food, so that nothing shall be lost by the changing seasons which may be adapted to the necessities of the race.

Our planet yields vast herds of animals, immense orchards of fruits, and gardens of vegetables, that are absolutely lost (or nearly so) because there are no means in use by which such products can be stored away and kept through any lapse of time. This ought not so to be. It need not be. It is too great a tax on human labor, and is the cause of too much suffering and want, to remain a permanent and incurable evil.

Besides, the present is the fittest period yet known in which such a discovery should be made. We not only need this knowledge, but we need it *now*, while so many of our fathers, brothers, and sons, are wearing the livery of war, others are busied with the sick, wounded, and helpless ones at home ; *now*, when labor is so scarce and so exorbitantly dear, that agriculture is in a measure

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stripped of its attractions and its profits; *now*, when every thing eatable is sold at starvation prices, while adding but little to the wealth of the producers. Surely if nature always responds to every well-defined necessity, this great *want* may be gratified—and, if she imparts such information at the most timely periods, we have a right to expect that our age will be made memorable by the discovery.

WASTE OF FOOD.

In Southern California, Texas, a large part of South America, Africa and India, hundreds of thousands of fat beeves are annually slaughtered; the hides and tallow of which, only, are preserved for use. Millions of tons of most wholesome food are thus actually thrown away; and as a consequence we are obliged to pay enormous prices for what is saved in other lands.

The orchards of the world are prolific and abundant; but, beyond a few short weeks in autumn, they yield little of value to us as food. In fact, it is an open question still, whether more fruit is consumed by human stomachs than is lost by decomposition and decay. The same may be said of all vegetable productions, and the vexatious waste enters largely into fish, butter, cheese, lard, eggs, poultry, game, and in short into almost every thing that constitutes human food. Even grains, whether in their native condition, or manipulated into meal and bread, are not exempt from the disheartening ruin.

A REMEDY IS DISCOVERED,

and the object of this pamphlet will be accomplished if we succeed in fixing the attention of business men upon the certainty and immense value of the discovery.

Several years ago, Hon. Daniel E. Somes, then a member of Congress from the State of Maine, became duly impressed with the great human need we have been describing, and resolved to devote

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himself to study and action upon means for its supply. The question "how can all kinds of food be preserved in all seasons and in all climates?" he has succeeded beyond his most sanguine hopes in solving: for he has not only been able to invent means for preserving food in all climates and at all seasons, but, by the same principles and by mechanical aids, he is able to make them effective while their subject is in process of transportation.

Furthermore, he has discovered means for adjusting and regulating the temperature of the atmosphere in all buildings erected upon his plan, down to the freezing point, and even far below it. He can also cool and ventilate buildings constructed in the usual manner, so that they shall be pleasant and agreeable in the hottest weather.

Mr. Somes has secured his inventions by eight different patents.

THEORY OF THESE INVENTIONS.

All great discoveries in science or mechanics are founded on a few simple and well-known principles of nature and philosophy. As a rule, those inventions which are most simple in construction and most easily comprehended, possess more elements of usefulness than all the rest. Mr. Somes has fortunately directed his researches along a line of knowledge that was well defined and fully understood, and removed so far as possible from regions of abstruse speculation or occult science. He assumed—

First. That it was not the accident of latitude or longitude, but the presence of caloric and impure gases, that rendered it impossible to preserve food in certain localities, and at certain seasons.

Second. That, but for the presence of solar heat, our atmosphere would be in a constant state of intense cold—so cold, indeed, as to render animal or vegetable life an impossibility upon our

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planet. Hence, all that is required to produce any given degree of cold is a proper mechanical contrivance for excluding the effects of the sun. In brief, heat is an active and positive agent of nature, while cold is her negative and passive condition. Heat is manufactured, so to speak, by the action of the sun; while cold is a condition that cannot be made by any agency. It is merely the absence of heat—the natural condition of the atmosphere, to which it will always relapse when the effect of the sun's rays or artificial heat is excluded.

Third. That heated air is constantly ascending, and colder air as constantly descending to fill its place, wherever conditions render such exchanges possible.

Fourth. That food, if kept from the action of heat and hurtful gases, in an atmosphere a little above the freezing point, might be preserved for any length of time, in any climate.

Upon these four plain and simple propositions rests all that is desirable here to communicate of the theory upon which Mr. Somes has pushed his valuable researches.

PACKING-HOUSES.

Quite naturally, the attention of the inventor was first directed to the erection of houses for packing meats. He learned that beef was generally spoiled if salted and barreled in an atmosphere above 55 degrees Fahrenheit, and that pork requires to be cured in an atmosphere of about 40 degrees. The inference, therefore, was plain: Let the house for packing beef be so constructed that a higher degree of heat than 50 degrees shall never be attained, and for pork, let the temperature be reduced to 40 degrees.

THE VALUE OF THESE PACKING-HOUSES

cannot be overstated. The mind shrinks from any attempt to estimate it. When we reflect that hereafter not a pound of anim a

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flesh need be lost to mankind, but may be preserved for indefinite time, a great store for seasons of scarcity or famine, and that, instead of a limited belt of the globe, running down to about thirty degrees of latitude, being the only region in which meats may be preserved, the whole earth is at once laid open to the packer's enterprise, we may catch a faint idea of the value of the discovery.

CARS AND VESSELS FOR TRANSPORTING FOOD

may be arranged upon the same scientific principles. By the mechanical apparatus secured by these patents, a railway car, or hold of a ship, may be kept as cool as is desired; which ensures the preservation of all kinds of food while being transported.

Hereafter, tropical fruits may be allowed to ripen on their boughs, and then be brought to Northern markets in the fullness of perfection, with little loss of flavor or substance; and, in exchange, all the productions of more northern regions can be delivered in the exact state in which they are shipped. By these means, the most delectable productions of all climates may become staples of commerce, and many sources of lucrative trade, heretofore closed to the world, may be opened and expanded.

VALUE OF THESE MEANS OF TRANSPORTATION.

In the year 1863, there were two millions and a half of beeves slaughtered in the city of New York; nearly all of which were brought to the city by railway cars, and a great majority of them from the Western States.

Let us see what the saving would have been had these animals been slaughtered in the States where they were raised, and their flesh forwarded to the metropolis, instead of transporting them alive:

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The loss by death on the cars is four per cent.
The loss by shrinkage, sixteen per cent.
Loss by money paid for food, care, and extra freight on offal, &c., five per cent.

Thus, in one city, and upon one article of food, there was an absolute loss amounting to fully five millions of dollars.

The losses sustained in transporting living hogs and sheep are proportionably still greater, and the waste and improvidence increases with poultry and eggs, until we reach the confines of actual prohibition.

As an instance, eggs may be purchased in Illinois and Iowa during the spring months for ten cents per dozen, and the actual expense of packing and freight seldom exceeds an additional cent. But, by reason of the great losses while in store and transit, New Yorkers seldom purchase that choice article of food at less than twenty-five cents per dozen. Thus, it is clearly demonstrable that eggs, in New York, cost more than double what they ought, if proper means were provided for their transportation.

In our large cities, *game* is placed beyond the reach of all except the rich and extravagant, by its exorbitant price. A citizen of Philadelphia or Boston can scarcely realize that venison is purchased in Wisconsin and Minnesota at less than five cents per pound, prairie chickens in Iowa at eight cents each, and that ducks, geese, and brant, are so abundant in the region of Hudson's Bay and Davis's Straits, that noon sometimes becomes almost midnight in darkness by their passing shadows while in flight.

When the Pacific Railroad is finished, and Mr. Somes's inventions are fairly introduced, hunters will cease to slay buffaloes for their skins alone, and the great prairies will give up their treasures of food for human use as freely as they have heretofore yielded their wealth of furs.

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A building that preserves meats will produce the same result with fish, and the same means of transportation will answer for both.

FRUITS

are subject to losses by decay no less disastrous than those of meats or fish. Indeed, they are believed to be more general and disheartening. Not one half of the fruits of the earth ever reach human lips, and even that portion which actually becomes food, fails to afford us that delight and nourishment it ought, for the reason that we can obtain it only at certain seasons, and then must eat it with the knowledge that what is not speedily consumed must be lost.

The peaches of Illinois, Missouri, Kentucky, and Tennessee, though the most delicious of earth, pass away in a few short weeks, and become of no value to the world, because no means have been provided by which they may be transmitted in good order to market.

Tomatoes need not be packed away in tin cans, with the air excluded, but may be housed in barrels or in heaps, as suits the pleasure of the gardener.

BUTTER, CHEESE AND LARD.

Through various influences, but chiefly from a want of knowledge, these articles of food have become so expensive as to be placed almost beyond the reach of the poor. This need not be. Mr. Somes's buildings and means of transportation will forever remedy this great evil; for they may all be preserved and carried to their destination with or without salt or other artificial aids, as the circumstances of the case may prove most desirable.

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We believe that nothing is hazarded in the prediction that the price of all such commodities will be lessened fifty per cent. by Mr. Somes's inventions. It is not because the cows of all southern latitudes afford milk of inferior richness, that no butter is made there; but because it has been deemed impossible to preserve that product by any means heretofore discovered. Hereafter, butter may be stored in firkins, and lard packed away in barrels, with as perfect certainty of its preservation in Florida as in Ohio.

FERMENTED DRINKS.

The article of lager beer in this country requires an annual expenditure of more than a million of dollars for ice; and malting grain for fermented drinks is only done in the cold season and at a wasteful outlay of time and money. Wine-vaults are far more expensive than these buildings, and the air less pure and wholesome.

SUMMARY.

We pause here, not because the subject is exhausted, but lest our claims should seem too great for realization. There can be no doubt that the mind which has witnessed a demonstration of the foregoing uses will suggest a hundred others, to which these inventions may be savingly applied—all tending to economy in money and labor, and to the comfort and happiness of mankind.

There is, however, another line of useful discovery in which Mr. Somes has been no less fortunate and successful; and that is a process for cooling and purifying the atmosphere in any room, and at the same time securing perfect ventilation. We ask especial attention to the uses secured by this class of inventions.

HOSPITALS

may be so arranged that neither heat, flies, nor dust, need ever be present to harass and torment the patients. This is accomplished

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also at a cost so comparatively small as scarcely to deserve a mention. Had Mr. Somes made no discovery but this, he would be entitled to (and would receive) the gratitude of the race. But his inventions do not terminate here.

PARLORS, DINING AND SLEEPING ROOMS,

at an inconsiderable cost for each, may be so arranged that, by opening a valve with the thumb and finger, any desired degree of coldness may be obtained—the labor required being no greater than for turning off the gas. The cool air will banish all flies and musquitoes; and, as the windows must be closed, no dust can enter.

CHURCHES AND PUBLIC HALLS

may be cooled and freed by similar means, and no careless listener can solace a wounded conscience by referring his inattention to the drowsy state of the atmosphere.

BANKING HOUSES, STORES, MACHINE-SHOPS AND OFFICES,

may all be kept as cool as may be wished by these inventions, and that at an expense so small as must seem trifling in proportion to the comforts and healthfulness imparted.

In the erection of all public and private buildings, elaborate methods are adopted for the protection of the occupants against the severity of winter weather; and in the more costly edifices a large expenditure is incurred, and great ingenuity is displayed, in the construction of furnaces and other apparatus for heating. And the vast outlay for fuel to promote comfort and preserve health, is submitted to as a necessity. It is estimated that by means of artificial heat the temperature of dwellings is mitigated about thirty-

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five degrees on the average. But while so much is done toward alleviating the rigors of winter, no systematic attempt has been made for shielding our houses, or churches, or hospitals, from the furnace-like breath of summer. People flee to the woods and mountains to escape the "firey darts" of July and August, and woo the cooling breezes. which in their occasional coming, are welcome as odors from "Araby the blest." Yet, by the adoption of philosophical and well-known principles, at trivial cost, the suffocating, enervating, and unhealthful heat of midsummer might be replaced by air cool, refreshing and salubrious as the atmosphere of Beulah. If to those in health the sultry summer days are oppressive and debilitating, how much more suffering they bring to those who are languishing on beds of sickness. Hereafter it must be recognized as an essential sanitary measure that houses should be so constructed that a soft and comparatively cool atmosphere may pervade them in summer. The inventions of Mr. Somes, by the use of simple and inexpensive apparatus, will effectually secure this desired result, even in buildings already constructed and occupied.

This system embraces the manufacture of

REFRIGERATORS,

for hotels, ships and dwellings, that shall be far superior to any now in use. No refrigerator heretofore known has been able to preserve food except from day to day, and such are never free from vapors and unwholesome gases.

MANUFACTURE OF ICE.

We stated above that buildings may be constructed upon the plan of Mr. Somes in such manner as to secure any degree of coldness that may be wished, down to the freezing point, or even below it. If that proposition be correct, it must be evident that we can manufacture ice to any extent we please.

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Metallic pans with pure water are placed in the buildings constructed for the purpose. Aside from other considerations that readily present themselves to the mind, it may be interesting to state that the exact weight of every block of ice is stamped upon it by means of figures on the interior of the pans, and that such blocks are always of the size and shape demanded, varying from one to one hundred pounds, as the market shall require—thereby saving time in its delivery and a large percentage of waste.

REMARKS.

The foregoing embraces all we deem it proper to make public at present of Mr. Somes's inventions—both of the objects actually attained and those confidently anticipated. If any man is startled at the magnitude of our pretensions, let him remember that the age we live in has produced steam as a motive-power, and has made electricity an errand-boy. Even the atmosphere is now a carrier of the mails, and human likenesses are painted by the rays of the sun.

Mr. Somes makes no claim that is not founded upon principles eminently practical, and every part of his mechanical arrangements is as free from complication as his philosophy is from subtlety and doubt.

THE PATENTS.

Let it be remembered that, while these patents are eight in number, the line of discovery so immensely broad, and the results accomplished so vast as to become almost fabulous, still, the *principles* upon which they are founded are easy of comprehension, few in number, and identical in all.

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Any practical man, therefore, without the aid of a mechanical education, can apply them to actual use. It will not be the fault of the inventor, but of the business men of the country, if another season is allowed to pass without witnessing a general movement for their adoption. It remains with the enterprise of our citizens to determine whether this shall be done *now*, or left for the future to accomplish.

TESTIMONIALS.

The Hon. Horace Greeley, editor of the *New York Tribune*, after a full investigation of these discoveries and their philosophy, wrote and published the following, under date of Nov. 24th, 1864:

THE PRESERVATION OF FOOD.

The decay of all material organisms is an inexorable law of nature. 'All that 's bright must fade,' and all delicate and admirable structures must, more or less rapidly, dissolve and perish. This law is specially imperative with regard to nearly everything used for human food, whether of animal or vegetable origin. The more exquisite and delectable the combination designed to tempt and satisfy the appetite, the more urgent is the tendency of its ingredients to form new combinations with the elements which surround and approach them, and thus become at once revolting to the taste and noxious to health and life. That venison, for instance, should only be eaten the day before it could *not* be eaten, is a perverse maxim that illustrates the law in question. In spite of universal care and forethought, millions' worth of food are destroyed daily through its action, and innumerable buffaloes and other cattle are slaughtered for their hides, and the carcasses left to rot where they fell, because the conditions necessary to their preservation for food do not there exist. Of Fruit and Vegetables, the annual loss by decay transcends all estimate, all conception; and thousands famish for want of the bounties of nature which, but a few weeks earlier, decayed and passed away before their eyes, they being impotent to prevent the ruin.

Several years ago, Mr. Gail Borden brought from Texas to this city his invention of a "Meat Biscuit," whereby the flesh of the

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domestic animals then abundant and of little value in Texas and Florida, as well as that of the still greater number roaming over the vast plains of South America, was to be preserved and made to minister to the sustenance and comfort of man. The biscuit was palatable as well as highly nutritious, but circumstances did not then favor the invention; so Mr. Borden turned his attention to the manufacture of Solidified Milk, which has gradually grown into a vast business, whereby he is making a fortune, while contributing widely to the comfort and well-being of mankind. His biscuit will yet be extensively produced and appreciated.

For several years past, the Hon. D. E. Somes, late M. C. from Maine, has been at work on Meats, Fruits and Vegetables, with a view to radical improvement upon existing methods of cure and preservation; to which end six distinct patents have been issued to him. He bases his efforts on the scientific truth that the atmosphere is naturally cold and adverse to decay—that heat is a product of sunshine or of some artificial device or procedure. He proposes, therefore, to secure the preservation of whatever is now destroyed or injured by heat, through the construction of houses designed to preclude the admission of heat. * * * * * * * * * * Fresh meats may be packed or kept fresh through dog-days, their animal heat and all putrefying gases being expelled with a rapidity hitherto unknown; while fruits that now decay and become worthless, within a few days at most, may be kept unchanged for months, insuring ample supplies of fresh strawberries and peaches at Christmas, and of grapes throughout the Winter and Spring.

We have refrained from any but the briefest and most casual allusion to Mr. Somes's mechanical devices to secure the ends he meditates, as those interested will be satisfied with nothing short of a careful scrutiny of his drawings and specifications. The merit of his invention inheres in its fundamental idea or principle, which affirms the natural coldness of the atmosphere and the possibility of maintaining it through the simple exclusion of the sun's rays and the breezes that diffuse their heat, through the construction of buildings which keep this end steadily in view. Should its efficacy be established, every market as well as every slaughter-house must be provided with a building or with buildings based on Mr. Somes's ideas and devoted to the preservation of articles intended for food, and a very decided revolution must ensue, not merely in meat-packing and fruit-preserving, but in various branches of industry—not less than $1,000,000 per annum being now paid for ice in this country by the manufacturers of lager beer alone. The subject cannot fail to attract and reward the attention of business men.

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[ADVERTISEMENT.]

For the purpose of selling the rights of the Inventions above described, and for organizing Stock Companies for putting them into practical operation, I have opened an office in EXCHANGE BUILDING, Nos. 78 and 80 Broadway, and 5 and 7 New Street, New York, (first marble building below Wall Street,) where information will be given to those who may feel disposed to invest large or small sums of money, either in stock certificates or local Rights.

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D. E. SOMES.

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Somes, D. E.
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(H. C. 1830.)

MR. D. E. SOMES' PLAN

FOR

Ventilating, Cooling and Heating the Capitol,

AND FOR

PURIFYING AND MOISTENING THE AIR.

To the Hon. Committee on Public Buildings.

This memorial is intended to call the attention of your honorable body to the following means of ventilating, cooling, and warming the United States Capitol, and of purifying and moistening the air before it is admitted to the halls.

By my method the temperature of the air to be supplied in hot weather is reduced as low as the temperature of the earth would be at a depth below the surface where the influence of the sun's rays is inappreciable. This depth varies in different localities, but the variation is due only to existing local causes, such for instance as the presence of a very cold or warm spring of water. It is known from observations made in deep cellars, wine and ale vaults, and other excavations, that a depth of from twenty to forty feet below the surface would be sufficient to insure a temperature of from 45 to 50 deg. Fahr. during the hottest days in summer.

This fact is taken advantage of in my method to secure a thorough ventilation to any large edifice by supplying a copious flow of pure and cold air during the summer, and pure warm, and sufficiently moistened, air during the winter.

Sheet No. 1 represents an outline ground plan of the Capitol, and of the structures I have adopted in my method of supplying the building with pure and warm or cold air.

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Sheet No. 2, figs. 1 and 3, exhibit cross sections of the chamber C, sheet 1, and different arrangments of the coils of cooling or heating pipes. The coils, as in fig. 1, being arranged to allow passage through the centre of the chamber, or as in fig. 3, to allow such passage on each side, near the walls of the chamber. Fig. 2 is a sketch showing partially the longitudinal arrangement of the pipes in the coil, which will be better understood by reference to sheet 3.

Fig. 4 is a cross-section of the air duct B, seen in dotted lines on sheet 1, and showing a water-pipe E, suspended near the crown of the arch, the use of which will be hereafter more fully described.

Sheet No. 3, fig. 5, shows a longitudinal vertical section through the centre of the chamber C, showing the manner of arranging the coil of pipes for *cooling* purposes.

Sheet No. 4 shows an elevation and section of one of the towers A, seen in plan—sheet 1.

Sheet No. 5, figs. 1, 2, and 3, shows devices for moistening the air that has been *heated* for *warming* purposes, and which will be more particularly referred to hereafter.

A, A, sheet 1, are two towers about twenty-five feet square, placed at some distance from the building, say two hundred yards, or thereabouts, from the building to be ventilated, and sufficiently far apart to be symmetrical with their altitudes, which should be great enough to permit their tops to be above impurities and to be in a stratum of cool air. This height I have assumed to be about one hundred and seventy feet. These towers are the supply pipes to the ventilating apparatus, and are constructed with hollow walls so as to have a non-conducting air space between their inner and outer surfaces in order that the sun's rays shall have no power to heat the air on its downward passage. The air space in the thickness of the walls still further tends to operate as a cooler on the inside walls by the action of evaporation going on within it, from the bottom, where it is closed

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and naturally damp, to the top, where it is open to the atmosphere.

The wells or inner chambers of the towers are open to a free ingress of air at top and extend down below the surface of the ground to a distance of about thirty feet, where they each communicate with an air duct (B, seen in dotted lines sheet 1, and in section sheet 4) extending horizontally from the bases of the towers, in as great a circuit as may be desired, to the chambers of the ventilating fans in the building.

The floors of the ducts will be on a level with the bottoms of the tower shafts and they will have a height and width of, say, twelve feet, and be covered with a semi-circular arch resting upon walls of a proper thickness. At the ends of the ducts nearest the fan-rooms in the building they will be enlarged into chambers C, (see sheet 1, 2, and 3.)

The bottoms of these chambers are twelve or fifteen feet lower than the floors of the ducts, while their tops are on about the same line as those of the ducts, and they are about forty feet in length by, say, twenty in width. Other chambers similarly constructed may be made in other parts of the ducts should they be required, though they are not deemed necessary.

The use of these chambers is to receive coils of water pipes, so arranged that they—passing through the masonry into the chamber at that end of it which is furthest from the fan—shall be carried directly down to the bottom of the chamber, thence along the whole length of the bottom towards the fan, *through a medium of extreme coolness*, when it will rise to the crown of the chamber, or near it, and be returned so as to descend again to the bottom of the chamber, in the same vertical transverse plane as the first descent, and be carried again along the bottom of the chamber to rise and be returned as before; and the coils necessary for such a flow of water are continued and repeated until as much cooling surface of

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water-pipe is obtained as room will permit, leaving space for passage either through the middle or at the sides. (See sheets 2 and 3.) The cooling medium, in the bottom of the chamber through which the pipes pass, may be a reservoir or spring of water, whose coolness is due to its natural depth below the surface, or a packing of ice which would last, under such conditions, for a long time.

That portion of the coil which is vertical at each end of the chamber is composed of different lengths of pipe placed alternately, so as to make two rows of different altitudes extending along the upper part of the chamber C, for the purpose of having the pipes in which the *cooled* water flows distributed, as much as possible, throughout the air flowing through the duct and chamber. To this end, therefore, three or more rows of horizontal pipes may be built in the top of the coil, the vertical pipes being in lengths to suit. It will be seen, moreover, that the coil is so arranged that the water cooled in its passage along the bottom of the chamber shall rise in those vertical pipes that are nearest to the fan, and descend in the pipes at the opposite end of the chamber. This is in order that the air may have as little space as possible to traverse to reach the fan after being in contact with the coldest pipes. What little elevation of temperature the water may receive in its passage along the top pipes of the coil will be reduced again as it flows along the bottom, through the cooling medium. The arrows on sheet 3 indicate the direction of the flow of water through the coil. After the water has passed through the coil, it may either be made to flow through other coils or pass directly to purposes of ornament or use.

If deemed expedient, a coil of cooling-pipe may be introduced into the fan chamber to act on the air in its passage from the fan to the rooms where it is required, though it is not contemplated that such an arrangement will be at all necessary.

A pipe (E, fig. 4, sheet 2,) larger in diameter than the

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pipes composing the coil extends along the duct, near its crown, through which water flows towards the tower. This pipe is perforated at intervals along its length with minute holes, through which the water jets, in fine spray, still further conducing to a low temperature of air in the duct. Near the tower the pipe is carried through the masonry, and the water is conveyed away for useful or ornamental purposes, or it may be returned to pass into the coil of smaller pipes, which are located in the chambers C, before being thus used. The fan may be dispensed with if a system of water-pipes be placed within the towers. The air, being cooled by said pipes, becomes condensed and, consequently, heavier. It falls and forces its way through the ducts into the halls, to be cooled where the air is warm and light. If the outward draft flue or eduction passage for the warmer air be connected with a chimney or heated flue, or be in close proximity thereto, the amount of cooled air flowing in from the ducts will be increased.

In cold weather the pipes of the coil, instead of being charged with cold water, are converted into steam pipes, for the purpose of *heating* the air supplied by the ducts B. The temperature of the earth below raises the temperature of the air to about 50°. A very small amount of steam, therefore, is required to bring it up to the requisite point, say 68°. Steam may also be used, as is now done, in the passage from the fan to the room. The waste steam may be, moreover, used to keep up the temperature to the proper degree, and counterbalance the loss by radiation through the walls of the air channel, as well as to aid in preventing the air from becoming too dry, the amount of moisture supplied to the heated air being regulated as hereinafter set forth.

The air is moistened by the use of pipes introduced either into the subterranean air ducts or into the chambers above the fan, which pipes have short and minutely perforated branches, through which the steam may jet. Fig. 1, sheet 5, shows a portion of such pipe, with some

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branches connected with the main pipe by stop-cocks. As the air passes along, over, and among the pipes it absorbs the vapor, and becomes moistened thereby.

When steam would not be available for use in moistening the heated air a vat of water is placed in the duct, over which the air must pass on its way to or from the fan, and a revolving drum or cylinder—deriving its motion from the same power as the fan—covered with cloth, sponge, felt, or other suitable material, is placed in the vat so that as it revolves there shall be constantly presented a wet surface to the current of heated air as it flows. (See fig. 2, sheet 5.) In fig. 3, same sheet, is shown, in section, a modification of the revolving drum or cylinder, the peculiar construction of which secures a much greater surface for moistening the air than is obtained in a plain cylinder like fig. 2. Spray jets of warm water may be thrown through the air in the duct, which, as it passes, will collect moisture therefrom.

A smooth metallic glass or glazed earthen vessel, supplied from a water-cooler, or from the system of cold water-pipes hereinbefore described, or by any other effective mode, and placed within said room, will denote the amount of moisture contained in the air by the "sweat" or condensed vapor accumulated on the surface of the said vessel. The temperature of the vessel should be noted, in order that the regulation may be satisfactory.

The roof of the House and Senate Chambers being of single glass, the rays of the sun necessarily produce intense heat in those halls during the hottest days in summer, while in winter cold is admitted, varying with the temperature of the atmosphere without. To prevent this evil in a great degree, I propose to have a series of glass roofs or ceilings, one above the other, separated by only a few inches, so as to leave non-conducting air spaces between them. These air chambers should be tight enough to prevent a circulation or change of air within them. A few inches above the upper glass roof a transparent cover

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or roof, made of cloth, or other suitable material, and painted white, may be placed to mitigate the heat of the sun's rays. A free circulation of air between the glass and said covering should be allowed. Of course, this covering should be firmly held in place against destruction or injury from heavy winds and storms. This may be done by constructing a frame similar to window sash, and, after placing and stretching the cloth upon it, strong strips should be screwed or otherwise fastened upon the frame, so that the cloth shall be held between them in panels or squares. As air is a non-conductor and glass a poor one, the object of excluding heat and cold, while light is admitted, will be accomplished by the adoption of this or a substantially equivalent device.

Respectfully submitted,

D. E. SOMES,

476 *7th street.*

WASHINGTON, D. C., *Jan.* 28, 1867.

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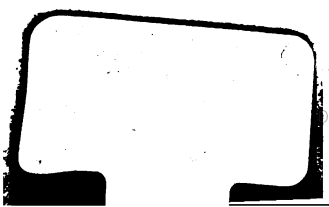

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